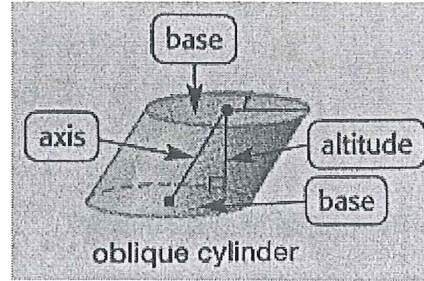
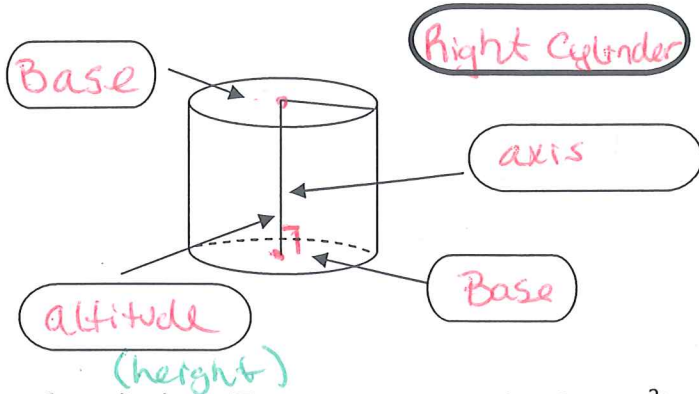
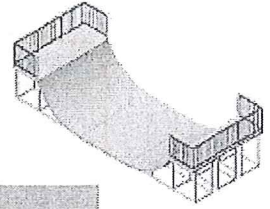
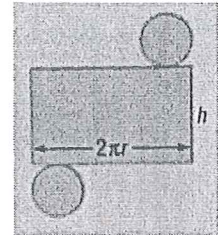


- GOALS: 1. Find lateral areas of cylinders.
2. Find surface areas of cylinders.

Extreme sports such as in-line skating, biking, skateboarding, and snowboarding use a cylindrical-shaped ramp called a half-pipe. The half-pipe looks like half of a cylinder.

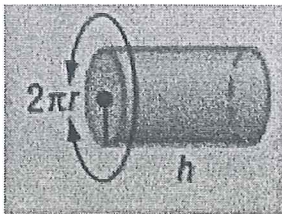


Net of a cylinder – Two congruent circles ($A = \pi r^2$) and a rectangle ($A = lw$). Length of the rectangle is the same as the circumference of the base (circle), $2\pi r$.



LATERAL AREA OF A CYLINDER

If a right cylinder has a lateral area of L square units, a height of h units, and the bases have radii of r units, then



$$L = 2\pi r \cdot h$$

↑
Circumference
or
 $L = C \cdot h$

Recall: Surface area = Lateral Area + Area of the bases

SURFACE AREA OF A CYLINDER

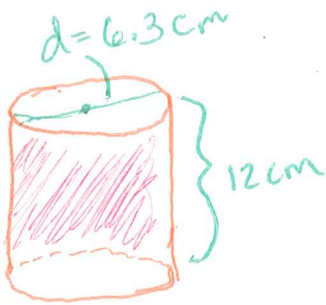
If a right cylinder has a surface area of T square units, a height of h units, and the bases have radii of r units, then

$$T = 2\pi r \cdot h + 2(\pi \cdot r^2)$$

↑ Surface Area ↑ 2 Bases ↑ area of base (circle)

Example Problems:

1. A fruit juice container is cylindrical with aluminum sides and bases. Each can is 12 cm tall and the diameter of the can is 6.3 cm. How many square centimeters of aluminum are used to make the sides of the can?



$$C = 2 \cdot \pi \cdot r$$

or

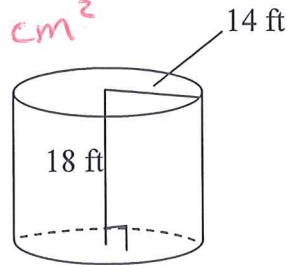
$$\pi \cdot d$$

$$C = \pi \cdot 6.3$$

$$L = 6.3\pi \cdot 12$$

$$= 276.9 \text{ cm}^2$$

2. Find the surface area of the cylinder.



$$L = 2\pi r \cdot h$$

$$L = 2\pi(14)(18)$$

$$L = 1,582.56 \text{ ft}^2$$

$$r = 14 \text{ ft}$$

$$h = 18 \text{ ft}$$

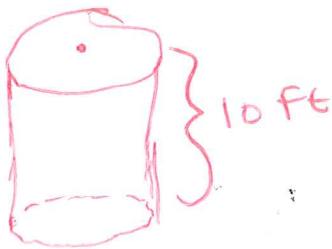
$$T = 2,813.14 \text{ ft}^2$$

$$T = L + 2(\pi r^2)$$

$$= 1,582.56 + 2(\pi \cdot 14^2)$$

$$= 1,582.56 + 1,230.88$$

3. Find the radius of the base of a right cylinder if the surface area is $48\pi \text{ ft}^2$ and the height is 10 ft.



$$T = L + 2\pi r^2$$



$$T = h \cdot 2\pi r + 2\pi r^2$$



$$48\pi \text{ ft}^2 = 10 \cdot 2\pi r + 2\pi r^2$$

$$48\pi = 20\pi r + 2\pi r^2$$

$$48 = 20r + 2r^2$$

$$24 = 10r + r^2 \quad -24$$

$$r^2 + 10r - 24 = 0$$

$$(r + 12)(r - 2)$$

$$\begin{aligned} r + 12 &= 0 \\ r &= -12 \end{aligned}$$

$$\begin{aligned} r - 2 &= 0 \\ r &= 2 \end{aligned}$$